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ABSTRACT

A literature review of 23 studies and two review articles dealing with the use of instructional materials by elementary and secondary school teachers is presented. Studies dealing with the development of instructional materials, discussions of field tests, and the results of teacher attitudes were not included. The findings on the use of classroom materials are grouped into four categories: (1) materials used in the classroom, including time spent using the materials, grade level differences, and differences in teacher planning and techniques; (2) the influence of materials on instructional content; (3) the influence of materials on teachers' decisions about instruction; and (4) the influence of materials on student learning. In a discussion of the implications for the use of instructional materials, it is pointed out that more attention has been given to the student-materials match than to the teacher-materials match. Other findings are: (1) Teachers rely heavily on print materials; (2) Instructional strategies change when teachers use textbooks rather than supplemental materials; (3) Student achievement may be affected by the way materials are used; and (4) Teachers should be trained in alternative uses of materials. An overview of the 23 studies describes the planning and design of each study, and citations of the studies are appended. (FG)

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A LITERATURE STUDY RELATED TO THE USE OF MATERIALS IN THE CLASSROOM

Submitted to
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Students spend as much as 90% of their classroom time in contact with instructional materials. Teachers reported spending up to 63% of their classroom time using printed materials, while spending 33% using non-print materials (Educational Products Information Exchange Institute, 1977). This same report also stated that about half of the responding teachers had not received any type of training in the use of the materials being used in their classrooms. Thus, it appears that teachers and students spend the bulk of their school day interacting with one kind of material or another; materials for which the teacher may have received little or no training in how to use effectively. Because of this concern, the use of materials in the classroom becomes an important instructional concern.

This literature review has been written for two purposes. The first has been to summarize information drawn from studies which directly or indirectly provide information about the actual use of classroom materials. Studies dealing with the development of materials, the discussion of field tests or the results of teacher attitudes about materials have not been included. The second purpose of this review has been to draw from the findings a set of implications for using classroom materials more effectively.

A great deal is known about how teachers behave in the classroom setting. Studies have quantified a myriad of variables including teacher talk, use of praise and/or criticism, and management techniques. However, only a fraction of these studies have looked at how teachers utilize classroom materials, while others have looked at teachers' use of

materials peripherally, as a secondary aspect. Therefore, locating studies on the use of classroom materials was a challenge because so few studies have as their stated purpose the examination of how materials are used. In an attempt to be thorough in locating appropriate studies, it was necessary to contact a number of recognized researchers personally, to read major studies about classroom teaching and to sift through studies specifically using classroom observation as a method of data collection. As a result, twenty-three studies and two review articles have been identified which include relevant data. Teachers of grades one through twelve and the subject areas of math, reading, social studies and science are represented. These studies use a variety of methods in order to obtain information regarding the use of materials. Table 1 presents the variety of samples and methods used to gather data in these studies. To move the reader directly into the findings related to the use of materials, the overview of studies (i.e., purpose, sample size, etc.) has been placed in Appendix A.

Findings related to the use of materials immediately follow this introduction. For purposes of clarity, the findings have been grouped according to four categories:

- materials used in the classroom
- influence of materials on instructional content
- influence of materials on teachers' decisions about instruction, and
- how materials influence student learning

Table 1

Characteristics of Studies Related to Use of Classroom Materials

Study	Sample	Method	Category
Anderson et al., 1979	27 first grades	treatment observations outcome measures	student learning
Barr, 1974	11 first grades	interviews outcome measures	materials used Instructional decisions
Berliner & Rosenshine, 1977	REVIEW ARTICLE		
Berliner & Tikunoff, 1976	20 second grades 20 fifth grades	ethnographic observations	student learning
Berneman et al., 1979	120 fifth graders	treatment observations outcome measures	student learning
Brophy & Evertson, 1976, 1977	1st year: 17 second grades 14 third grades 2nd year: 15 second grades 14 third grades	observations outcome measures	student learning
Cornbleth, 1979	16 fourth graders	observations	materials used
Elias et al., 1976	41 second grade teachers 54 fifth grade teachers 87 other teaching adults	program overviews logs outcome measures	materials used student learning
EPIE, 1977	8,619 building principals 12,389 classroom teachers, grades 1-12	survey	materials used
Filby et al., 1977	8 second grades 8 fifth grades	logs observations	influence content
Good, 1979	REVIEW ARTICLE		
Good & Grouws, 1977	41 fourth grades	observations outcome measures	student learning

Table 1 (continued)

Characteristics of Studies Related to Use of Classroom Materials

Study	Sample	Method	Category
Harootunian & Yarger, 1978	32 teachers; grades 1-6	observations interviews	materials used
Hawley et al., 1979	196 students; elementary and middle school	observations logs	materials used instructional decisions
Joyce & Harootunian, 1964	37 elementary student teachers	interviews	influence content
Kuhs & Freeman, 1979	3 fourth grade mathematics textbooks	taxonomy analysis	influence content
Landy-Lamiell et al., 1979	83 teachers; intermediate and junior high	survey	materials used
McDonald, 1976	44 second grades 53 fifth grades	observations videotapes logs outcome measures	student learning influence content instructional decisions
Mintz, 1979	70 teachers, grades 1-5	simulations survey	materials used influence content
Morine, 1976	20 second grade teachers 20 fifth grade teachers	simulation tasks simulated recall videotapes	materials used instructional decisions student learning
Shavelson et al., 1977	164 graduate education students	scenarios survey	instructional decisions
Soar, 1977	I: 55 teachers; grades 3-6 II: 70 teachers; grades K-1 III & IV: 22 teachers; grade 1 59 teachers; grade 5	observations audio tapes test scores	student learning
Stallings & Kaskowitz, 1974	105 first grades 58 third grades	observations outcome measures	student learning
Weber, 1978	4 ninth grade algebra classes	treatment observations outcome measures	student learning

Table 1 (continued)

Characteristics of Studies Related to Use of Classroom Materials

Study	Sample	Method	Category
Yarger & Harootunian, 1978	32 teachers; grades 1-6	observations interviews	materials used
Yarger, 1978	26 first grades	observations interviews	materials used

In several cases, the data from a single study was broad enough to be applicable to more than one category. The categories for each study can be found in Table 1.

Materials Used in the Classroom

Several studies were identified as providing relevant findings related to what materials were used in the classroom. Only six of them were designed to specifically seek information related to materials used in the classroom. Within this category, the following topics are discussed: time spent using materials; materials actually used; school or grade level differences; and teacher differences in planning or in using materials.

Amount of Time

Cornbleth (1979) reported the time materials were used by students in fourth grade. It was reported that curriculum materials were used 54% of the student's total day. Of the time pupils spent in academic learning activities, 82% was spent using materials. Similarly, Yarger and Harootunian (1978) reported that intermediate classrooms (grades 4-6) used the text 55% of the time during reading instruction.

In comparison, the EPIE report (1977) indicated that 63% of teachers' classroom time was spent using print materials; while 33% was using non-print materials. The discrepancy between these reports may be due to the method of collecting data. Cornbleth (1979) and Yarger and Harootunian (1977) observed and reported actual use by students. The EPIE report (1977) reflected the teachers intended use of material. However, the evidence indicates that students and teachers are involved

with written materials for over half of the total school day; while additional time is spent working with non-print materials (Cornbleth, 1979).

Materials Used

The great number of materials available was highlighted by the EPIE report (1977). Results indicated that there are 5000 textbooks available in reading, math, science and social studies and 500,000 non-print materials. Emphasizing a student's contact with various materials, Hawley, Hill, and Wagner (1979) observed that children interacted with from 7-42 curriculum materials each day. The average number of material interactions was 22 in the elementary school and 13 in the middle school.

The most used materials were print materials such as basal readers (Elias and others, 1976; Yarger and Harootunian, 1977; Barr, 1974). In fact, basals were observed in 100% of the classrooms in the Yarger and Harootunian study (1977) while 75% of the teachers reported using basals to Elias and others (1976). Again, these conflicting figures may be due to differences between observations made in the classroom and teacher self-report. Barr (1974) found three different basals being used in the four schools involved in her study. She concluded that the basals all differed in emphasis. In contrast, EPIE (1977) reported that the most used texts in each subject appeared to be similar in instructional design.

Over 60% of the teachers in the Elias and others study (1976) reported using teacher made materials and games in reading instruction while less than half reported using math kits and/or manipulatives for

math. Supporting the limited use of manipulatives was the finding that in math, objects and games were used only 15% of the time (Cornbleth, 1979).

Morine (1976) found that teachers tended to make worksheets when planning for instruction. Of course, worksheets are printed materials. Thus, when Elias and others reported the frequency of teacher made materials, these may have been nothing more than worksheets.

School or Grade Level Differences

Barr (1974) reported that the urban and suburban schools in her study differed in their use of materials. While urban schools tended to use board work and dittoes for phonics instruction, the suburban schools tended to use workbooks. Time spent using reading materials varied: urban teachers reported using reading materials about one and a half hours a day while suburban teachers reported using reading materials about two and a half hours a day.

Differences in materials used at various grade levels were reported in two studies. Yarger and Harootunian (1978) provided data that the intermediate grade level teacher used the text or workbook at least 55% of the time while the primary level teacher used the text only about 50% of the time. Hawley and others (1979) documented differences between the elementary and middle school grades. They found that the elementary grades used more games, people, pictures, and charts while the middle school used more books and films.

Teacher Differences in Planning or Use

Forty-five percent of the teachers surveyed by EPIE (1977) reported

that they had played no role in selecting the major instructional materials which they were using. This same report further stated that about half of the teachers had not received training in the use of materials which had been provided for them. Of this group, 25% received training from a publisher's representative, 15% from a school district consultant and 14% from some other source.

Thus, when it comes to planning, it should come as no surprise to learn that teachers placed a heavy emphasis on the basal reader to guide them in preparing both short and long-term instructional plans (Morine, 1976; Mintz, 1979; Yarger and Harootunian, 1977).

It does appear that personological variables make a difference. A conceptual level study by Harootunian and Yarger (1977) reported findings that lower conceptual level teachers had a greater variety of materials in their classrooms but did not use them. Higher conceptual level teachers were more sensitive to the learner's needs and were less dependent upon the basal materials to guide them regarding what should be taught next.

Teacher differences also appeared in relation to grade level being taught. Yarger and Harootunian (1978) reported that primary teachers used materials with small groups, functioned in fewer roles while using materials, and performed the role of instructing more than did intermediate teachers.

Influence of Materials on Instructional Content

Berliner and Rosenshine (1977) have provided a review of the research on how knowledge is acquired in the elementary classroom. After

looking at the curricula to be taught, they found that commercial publishers decide what is to be taught by placing particular content in their textbooks. Although curriculum materials may provide only a starting point for content, dependence on the text was further supported by researchers who found that student teachers displayed vague and unclear objectives while relying on texts for information and topics (Filby, Marliave, and Fisher, 1977; Joyce and Harootunian, 1964).

The influence of textbooks on teachers' selection of content is supported by Kuhs and Freeman (1979) and Mintz (1979). Kuhs and Freeman reported that variation in content covered in textbooks may result in different content being taught; especially, for teachers bound to a given textbook. Further underscoring the significance of materials on classroom content, they stated that the content decisions which are left to the teacher usually require a fairly high level of conceptual expertise. Sixty-three percent of the teachers consulted materials when making decisions about the content for classroom instruction (Mintz, 1979).

Influence of Materials on Teachers' Decisions About Instruction

Findings by Shavelson, Caldwell and Izu (1977) and Yarger and Harootunian (1978) indicate that teachers' instructional planning was influenced by the materials provided. These researchers found that teachers may rely solely on a publisher's recommendation. Thus, instructional decisions are dependent upon the learning sequence prescribed by the text. This dependence is emphasized by the Morine (1976) study which found that when teachers were asked to reteach a lesson, they made

little mention of changes in the instructional materials they used. Therefore, how teachers adapt materials to fit instructional needs of individual classrooms may be an essential component in understanding teachers' use of materials (Berliner and Rosenshine, 1977).

The type of classroom materials made available to teachers also may influence instructional strategies such as decisions about the size of groups, individualizing and teaching style. The availability of workbooks for phonics instruction lends itself to grouping. Conversely, board work and dittoes lend themselves to whole group instruction (Barr, 1974; Hawley and others, 1979). Specific styles of teaching, for example, direct instruction, imply the need for a particular method in using classroom materials. Thus, it is indicated that there could be a variety of effective approaches in using materials (Berliner and Rosenshine, 1977). However, the materials themselves may override a teacher's choice causing teachers to respond to the demands of the materials rather than to the needs of the students (Harootunian and Yarger, 1977).

How Materials Influence Student Learning

Eighty-five percent of the teachers responding to the EPIE study (1977) said that for the most part the materials provided to them were well-suited to their students. Suitability of the match between materials and students' needs may be of little concern with the addition of the variable of student learning. According to Berneman and others (1979), the matching of materials and students according to the Annehurst Curriculum Classification System does not significantly effect achievement, on-task behavior, or interest.

Student learning in the primary grades (1-3) was enhanced by the use of the basal reading textbook and a variety of materials (McDonald, 1976) including teacher made materials (Elias and others, 1976; Berliner and Tikunoff, 1976).

Of special interest to the primary grades were the variety of findings provided by Stallings and Kaskowitz (1972-1973). They found that the availability of a wide variety of exploratory and audio-visual materials was associated with children who were more independent and cooperative; who possessed greater verbal initiative, problem solving skills and self-esteem; and who produced higher reading and math scores but who were less task persistent. Classrooms where textbooks and workbooks were used most frequently produced children who displayed less independence, less verbal initiative, less self-esteem, less problem solving ability but tended to be more task persistent.

Fifth grade teachers with high pupil gain scores used the basal reader with no supplementary reading materials (Morine, 1976). In fact, McDonald (1976) found that a variety of materials was a negative predictor of pupil performance in fifth grade reading and math.

How materials are used also influences student learning. Simply having a variety of materials available is not sufficient; the teacher must arrange for their use by the students by providing a clear overview, controlling the structure of skills to be learned from materials, and sustaining steady feedback (Berliner and Tikunoff, 1976; Anderson, Evertson and Brophy, 1979; Weber, 1978; Good and Grouws, 1977; Soar,

1977). Teachers working with low SES students produced student learning gains when they presented materials in smaller chunks and provided an opportunity for repetition and practice. These effective teachers used special individualized materials in conjunction with the standard curriculum as well as multi-media approaches. In contrast, high SES students responded more positively to more difficult materials and adherence to the standard curriculum (Brophy and Evertson, 1977; 1976).

IMPLICATIONS ABOUT THE USE OF MATERIALS

The following conclusions were reached with some reservation. It must be remembered that many of the studies reviewed in this document did not state their primary purpose as one of studying how materials are used in the classroom. However, in each study reviewed, the author did state findings related to the use of materials. Therefore, the following assertions and implications have been ascertained from the findings provided. This discussion will focus on two areas: Materials Selection and Materials Use.

Materials Selection

The selection of materials for classroom use is crucial. Yet, it is unusual to find this aspect of material as a topic of study. The EPIE (1977) survey reported that 45 percent of the responding teachers had no role in the selection of the materials which they used. No other findings were reported related to teacher involvement in the selection of materials.

The selection of materials is an important issue for a number of

reasons. First, the majority of time students spend involved in academic activity, they are using materials (Cornbleth, 1979). Second, there are a multitude of materials from which to choose (EPIE, 1979). Third, teachers tend to rely on their materials for the content they teach and the instructional strategies which they use to teach that content. Finally, various student outcomes may be associated with the way in which materials are used in the classroom. For example, Stallings and Kaskowitz (1974) found that a variety of materials in the classroom is associated with greater student cooperation.

There are several considerations which can be kept in mind when discussing the criteria for materials selection: the match between the teacher and the materials; the match between student characteristics and materials; and the type of task needed to be accomplished.

All materials, including those not printed, vary in content, style and demands. One teacher may work more effectively with a particular type of material than another. For example, a teacher with a greater need for structure may work extremely well with a programmed text. Although there is no evidence indicating such, it makes sense that teachers will be more effective working with materials which engage their dominant teaching style and, therefore, with which they are the most comfortable. Of course, there is probably a relatively wide "comfort range" for teachers. The problem is the effect of forcing teachers to use materials with which they can not identify or work well.

Another aspect of the teacher-materials match is that materials can

be used in a variety of ways within the given structure. Just because the publisher suggests one method does not mean other ways of utilizing materials are impossible. Training in the use of adapting materials to a variety of situations could not only lead to a better teacher-materials or student-materials match, it might also result in a substantial savings to school districts. The ways of adapting materials are endless. For example, the amount of time the materials are used, the order of presentation and the addition of supplementary content can be varied. Teachers may already follow such a procedure to an extent. Morine (1976) found that teachers anticipated changes in the curriculum materials being used in their classroom. Crucial to this discussion is an implication from the McDonald (1976) study that differential methods of using materials are effective at various grade levels. This may also be true for various subjects and for pupils with a variety of characteristics.

More attention has been given to the problem of matching students' characteristics with the optimal materials. The Annehurst Curriculum Classification System was designed for just that purpose. This system provides for a somewhat prescribed selection process. Given that a student had x, y, and z characteristics then Materials A, B, or C should be used. The Cornbleth study (1979) found that students were using compatible materials 77 percent of the time they were interacting with materials. It was also found that students using compatible materials displayed more involvement than students using non-compatible material. Berneman and Others (1979) found that students interacting with materials compatible

by the ACCS did not achieve more, stay on task longer or display greater interest than students interacting with materials not classified as compatible. It is possible that the ACCS is not sensitive enough to determine compatibility. The time constraints of the study itself may have been too limiting. The need for additional studies in this area is suggested.

Also, the task to be learned should have potential influences on the selection of materials. Weber (1979) concluded that environments with greater teacher control contributed to greater achievement in ninth grade algebra. Perhaps, the subject area and the types of problems to be solved require materials with a high degree of structure. Soar (1977) found that pupil learning of low cognitive objectives succeeds best under highly structured conditions while higher cognitive objectives require more freedom to interact with the subject matter. The selection of materials should be related to the cognitive level of the skills being taught. For example, memorizing addition tables would be best served by highly structured materials while evaluating U.S. foreign policy would require less structured materials.

Materials Use

Reflecting on what the previously discussed studies have provided, a number of inferences become apparent about the teachers' use of materials.

- Teachers rely heavily on the use of printed materials and these materials tend to influence the instructional content of the classroom (Mintz, 1979; Joyce & Harootunian, 1964; Berliner and Rosenshine, 1977; McDonald, 1976).

Curriculum materials available to a particular teacher may not only dictate what is being taught to the children, but may offer the teacher the only source of information concerning a given topic. The power of materials as a sole reference material is not often considered. Additionally, teachers using the same materials may place emphasis on different aspects of the content. So that students in classroom A, using the same basal as those in classroom B, may master different skills from the B group. Especially startling about this implication is that since much of what teachers teach and students learn is determined by the curriculum materials with which they work; the impact of commercial publishers on what is going on in the schools could be great!

A second implication suggests that:

- Differences exist between the instructional strategies teachers select when using the same textbooks and between their selection/use of supplemental materials (Yarger and Harootunian, 1978; Cornbleth, 1979; Brophy and Evertson, 1976, 1977; Harootunian and Yarger, 1978; McDonald, 1976; Mintz, 1979).

It appears that a teacher's conceptual level or cognitive orientation might be an important variable in the choices teachers make about materials and in the roles teachers play while using materials in the classroom. Indeed, differences exist between the way primary and intermediate teachers function while using materials. It does appear, though, that the text does receive nearly equal emphasis in both primary and intermediate classrooms. However, the amount of time teachers spend using the text does not appear to be effected by either instructional strategy or teacher role while using the text. It is important to stress that no one method of using materials will be satisfactory for all the classrooms.

Implication three asserts that:

- The way in which materials are used may have an effect on student achievement (Good and Grouws, 1977; Brophy and Evertson, 1976, 1977; McDonald, 1976; Stallings, 1972-73; Anderson and Others, 1979; Soar, Filby and Others, 1977; Shavelson and Others, 1977).

By culling the findings related to student achievement from the various studies, a number of assumptions have been drawn: (1) teachers should provide information about the structure of the skills to be learned; giving an overview, sustaining feedback and a steady pace related to the style of the curriculum materials; (2) teachers attempting to teach low cognitive objectives should either be using materials which are highly structured or using less structured materials in a highly structured manner; (3) high cognitive level objectives probably require materials which dictate less student and teacher behavior and which allow for freedom to interact with the subject matter in a variety of ways; (4) clear presentations, especially in math, appear to be important; (5) the finding that a variety of materials is a positive predictor for second grade reading, but not fifth grade reading and math, appears to be associated with the type of skills being covered at each level; and (6) curriculum materials may provide the parameters from which teachers make content and pacing decisions for groups of students; they may rely solely on the publisher's recommendation or they may simply follow a prescribed order by putting low ability students into the sequence earlier that higher ability students.

The fourth Implication says:

- Teachers need to be trained in a variety of alternatives in the use of materials (Berkliner and Tirkunoff, 1977; Yarger, 1978; Mintz 1979; Yarger and Harootunian, 1977; Kuhs and Freeman, 1979; Brophy and Evertson, 1976, 1977; Shavelson and Others, 1977).

Although the training of teachers has not been noted for its long term effectiveness, more and more is being learned about the support systems needed to maintain newly acquired classroom behavior with teachers. As indicated in the study by Yarger (1978), teachers can be trained to use materials in a specific manner and to maintain such behaviors beyond a six-month lapse in training. Explanations about why this training was implemented and maintained in classrooms may be related to the materials themselves. The teachers felt that they made sense and were relevant to both teacher and student needs.

Training programs should include a look at the various alternatives materials offer, how instructional strategies and materials compliment each other, how to make decisions related to a child's needs and the demands of the curriculum, at the various kinds of materials and the most appropriate use for each, how time can be used more effectively, and how to take charge of their own instructional and content decisions.

SUMMARY

Clearly, evidence about the effective use of classroom material does exist in the literature and does provide for a skeletal framework. Teachers may need to modify or supplement the content found in published materials. Differential methods of using materials are effective at

various grade levels. This also may be true for various subjects, and for pupils with a variety of characteristics. Therefore, there can be no one theory of effective materials use. The evidence can also provide guidance for training teachers. Such training must not only familiarize teachers with the wealth of materials available but also provide them with skills to use those materials with the most effective strategies for increased student learning.

Appendix A

Overview of Studies

OVERVIEW OF STUDIES

Descriptive studies may use a number of methods to collect data, but always have the end result of describing a natural phenomenon. Several such studies have contributed to our knowledge of how materials are used in the classroom. The study with the largest scale is the survey conducted by the Educational Products Information Exchange Institute (EPIE) published in 1977. During the years 1974-1976, 8,619 building principals and 12,389 teachers of math, reading, social studies, and science in grades one through twelve responded to a written survey. The sample had been stratified and weighted randomly from all of the school districts in the United States.

Elias and Others (1976) conducted a study as part of the major Beginning Teacher Evaluation effort. This portion of the study was designed to determine whether or not teachers' reports of their activities were valid. Teachers were asked to complete program overviews for both reading and math as well as keep a diary of reading and math instruction for one week. These diaries were completed twice by paraprofessionals. The information from these diaries was organized to indicate grade level, subject, academic emphasis, quality of teaching methodology, complexity of organizational structures, and the variety and types of instructional materials. Ninety-three teachers completed both diary sets as did 87 other teaching adults.

Hawley, Hill, Spencer, and Wagner (1979) designed a study which documented the time in which materials were used, the typical number

of materials being used, the group mode of materials use, the type of materials being used, the curriculum area of the materials, and the characteristics of the materials being used in an elementary and middle school. Students to be observed in the schools were chosen randomly. The school staff served as observers in the elementary school while students kept logs in the higher grades. In the elementary school there was a nine day observation period in which eighty-three students were observed. Ninety-one students in the middle school kept logs. An investigator checking the validity of these logs found them to be reliable.

Yarger and Harootunian (1978) describe the materials and roles used by thirty-two elementary classroom teachers during reading instruction. Following the observations, each teacher was interviewed in a non-classroom setting. Yarger (1978) using similar methods, interviewed twenty-six classroom teachers; half of whom had been trained in the use of specific reading readiness materials. The teachers were also observed in their classrooms in order to determine which materials were in use, what materials were available, and what were the number and size of the groups using the materials.

A number of exercises were used with twenty second and twenty fifth grade teachers known to vary in pupil gain scores by Morine (1976). Teachers planned lessons, participated in stimulated recall, simulations, and interviews. Information on what materials teachers use was one of many areas of analysis.

Teacher planning was also the focus of a study by Mintz (1979). The purpose of the study was to describe the planning procedures of

seventy elementary teachers as they planned for reading. Specifically, one of the questions pursued was a description of the types of materials teachers consult as they are planning. This question was explored through the use of simulations and a controlled data bank.

Continuing in the descriptive vein, Barr (1974) explored the nature of decision making about grouping and pacing. Twelve first grade classes from four different schools were examined. The data included scores from standardized tests and teacher interviews. Initial interviews determined the composition of instructional groups and the page numbers of tests at which students were working. Follow-up interviews occured in May and the following school year. Eleven teachers completed the study.

Descriptive data on how time is allocated in the classroom and how much of that time is spent actively engaged was the purpose of the Filby, Marliave, and Fisher study (1977). Although not directly concerned with the use of materials, the results provided insights concerning how materials were used in the classroom. Eight second and eight fifth grade teachers kept logs of the content of their instruction in reading and mathematics and the amount of time spent in each content area by each student or group of students. Of this sample, six second grade classes were observed to gather data on the amount of time students were actually engaged in a learning task.

Another study not directly concerned with the use of materials, but one whose findings have implications for how teachers choose materials is that conducted by Shavelson, Caldwell, and Izu (1977). One hundred sixty-four graduate students in education completed a questionnaire after

reading a scenario concerning a fifth grade student. Data were analyzed using path analysis.

Joyce and Harootunian (1964) offer yet another descriptive study. This study was designed to determine the characteristics which differentiate student teachers on a problem solving task. Thirty-nine student teachers were interviewed following the teaching of a science lesson. The interview schedule was constructed to elicit the subjects' considerations of critical problem solving areas.

Landy-Lamiell, Reid, Barnette, and Szabo (1979) wanted to find out which information sources influence teachers in making decisions about materials. Questionnaires were given to eighty-three intermediate and junior high teachers. They were asked how likely they were to use materials recommended by a specific source on a scale from one to five. The effects of recommendation source and grade level were then tested.

Kuhs and Freeman (1979) examined three commonly used fourth grade mathematics texts to see if the content within the texts varied. Using a taxonomy matrix, the authors determined the implied curricula of the texts. The taxonomy included the general intent of the lesson, the nature of the material, and the operations which the student must perform.

About one third of the studies being reviewed related classroom behaviors to particular outcome measures. This was often done in an attempt to isolate effective teaching bheaviors. Cornbleth (1979) correlated curriculum material characteristics with pupil involvement in a learning activity. Materials and observed students were classified according to the Annehurst Curriculum Classification System (ACCS).

Pupils in four fourth grade classrooms were examined for achievement growth defined as continued improvement over a two year period on a standardized achievement test. Two high achievement and two low achievement growth children were identified in each classroom. These children were observed for approximately thirty minutes during math, social studies, language arts, and science lessons. Over one hundred pupil observations were completed. During these observations materials and activities were coded every minute.

Stallings and Kaskowitz (1974) reported on a large study designed to evaluate the effectiveness of the planned variation model used in Project Follow Through and to look for effective teaching behaviors. Thrity-six Follow Through projects with seven different sponsors were examined. First and third grade classrooms were ovserved using a variety of instruments, one of which focused on the materials being used in the classroom. Observed pupil behaviors were correlated with a number of outcome measures including achievement.

Another correlational study done on a relatively large sample was that done by Brophy and Evertson (1976, 1977). The purpose of this study was to isolate teacher characteristics associated with student learning gains. A sample of teachers was chosen for their relative consistency in producing student gain scores. Teachers were observed several times using both high and low inference measures. Presage and process teacher variables were related to standardized test scores using a combination of statistical methods.

McDonald (1976) reports on a study which used classroom observations to measure how teachers organize children for instruction, the types and

varieties of materials used in the classroom, the interactions relied on during instruction, and the specific instructional content being used. Pupil performance measures were administered twice. During the interim, observations were conducted on forty-four second and fifty-three fifth grade teachers. From three to eight observations were made on each teacher in his/her classroom. Videotapes of reading or mathematics instruction were made on one or more days. In addition, teachers kept a two week diary. This information was collated, categorized, and then related to pupil achievement.

Good and Grouws (1977) attempted to identify teacher behaviors associated with student achievement in fourth grade mathematics. Forty-one classroom teachers including nine who were relatively effective and nine who were relatively ineffective over two years were observed. There were between six and seven classroom observations for each teacher. Observers coded the manner in which time was used, high and low inference teacher and student behavior, and materials and homework. This data was analyzed using classroom mean residual scores.

Harootunian and Yarger (1978) examined whether seventeen elementary teachers categorized as higher conceptual level used materials differently than fifteen teachers categorized as lower conceptual level. The thirty-two teachers were observed during classroom reading instruction. They were then interviewed individually in a non-classroom setting.

Ethnographic techniques provided the basis for the Berliner and Tikunoff study (1977). This study examined the relationship between teacher behavior and student achievement. The sample consisted of twenty

second and twenty fifth grade teachers on whom student gain scores were known to vary. Ethnographers were trained to observe in each of the forty classrooms for one week. Protocols were read in pairs of effective and less effective teachers with discriminating behaviors being identified. These behaviors were defined and categorized and were then used to code the classroom protocols.

Soar (1977) reviewed four of his studies which used parallel methods and variables in examining the relationship of classroom behavior with pupil outcomes. In each study, classroom observations were made on a number of classrooms using high and low inference measures. These behaviors were then associated with pupil achievement.

Three of the studies being reviewed used an experimental method to collect data. Anderson, Evertson, and Brophy (1979) attempted to verify several correlational findings which indicated that particular teaching behaviors resulted in greater student achievement. In addition, the authors examined how treatments were followed in a natural setting. Seventeen first grade teachers were provided with a manual of twenty-two effective teaching principles. Ten treatment and ten control teachers were observed once a week from November until April. Observed behaviors were examined in relation to pupil avhievement and adherence to the effective instructional model.

Berneman, Dexter, Cooper, Cunningham, and Shores (1979) designed an experimental study aimed at determining the effectiveness of matching students and materials using the Annehurst Curriculum Classification System. Achievement, on-task behavior, and interest were the dependent

variables. One-hundred twenty fifth grade students were randomly assigned to materials classified according to six learner characteristics. Students were exposed to curriculum materials for forty-five minutes a day for ten days. Data were collected on all three dependent variables. The data were pooled, categorized, and analyzed into four groups; two matched and two unmatched.

The purpose of the experiment devised by Weber (1978) was to see if learning environments previously found to be effective in promoting pupil involvement were also effective im promoting pupil achievement. Two teachers were randomly assigned to intact classes of one-hundred fourteen ninth grade algebra students. These teachers set up four different learning environments found to influence student involvement.

Two review articles, Berliner and Rosenshine (1977) and Good (1978), contributed greatly to an understanding of how these studies fit into the broader picture of what is happening in the classroom.

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